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CLAIMS

- A waveguide assembly, comprising:
 - a waveguide embedded in a substrate material; and
- a waveguide connector coupled to the embedded waveguide, wherein the waveguide connector has a neck portion disposed transverse to the embedded waveguide and a waveguide channel passing though the neck portion forming a channel between the embedded waveguide and the surface of the substrate material, thereby providing an interface to a surface module.
- 2. The waveguide assembly of Claim 1, wherein the waveguide connector comprises a base portion formed transverse to said neck portion, wherein the base portion is suitable for stabilising the waveguide connector during a manufacturing process and/or when embedded in the substrate material.
 - 3. The waveguide assembly of Claim 1 or Claim 2, wherein the waveguide connector is made of an inert metal alloy.
- 15 4. The waveguide assembly of any preceding Claim, wherein a portion of the neck portion protrudes from the said surface of the substrate material.
 - 5. The waveguide assembly of any preceding Claim, wherein the neck portion is perpendicularly disposed with respect to the embedded waveguide.
- 6. The waveguide assembly of any preceding Claim, wherein the neck portion comprises one or more formation for providing a connection to a surface component.
 - 7. The waveguide assembly of any preceding Claim, wherein the waveguide channel accommodates at least a portion of the waveguide.
- 8. The waveguide assembly of any preceding Claim, wherein the embedded waveguide comprises an optical fibre.
 - 9. The waveguide assembly of Claim 8, wherein the optical fibre comprises a fibre mini-bend or tapered bend.
 - 10. The waveguide assembly of any preceding Claim, wherein the substrate material is a composite material.

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- 11. A panel for a vehicle fuselage, component, body or hull, comprising the waveguide assembly according to any one of Claims 1 to 10.
- 12. A vehicle comprising a panel according to Claim 11.
- 13. A method of manufacturing a vehicle, comprising incorporating a panel according to Claim 11 into a vehicle fuselage, component, body or hull.
 - 14. A surface module for interfacing to the waveguide assembly according to any one of Claims 1 to 10.
 - 15. A waveguide connector for interfacing a waveguide embedded in a substrate material to a surface module, the waveguide connector comprising a neck portion for disposing transverse to an embedded waveguide and a waveguide channel passing though the neck portion for forming a channel between the embedded waveguide and a surface of a substrate material.
 - 16. The waveguide connector of Claim 15, wherein the waveguide connector comprises a base portion formed transverse to said neck portion.
- 15 17. The waveguide connector of Claim 15 or Claim 16, wherein the waveguide connector is made of an inert metal alloy.
 - 18. The waveguide connector of Claim 16 or Claim 17, wherein the neck portion extends perpendicularly from the base portion.
- 19. The waveguide connector of any one of Claims 15 to 18, wherein the neck portion comprises one or more formation for providing a connection to a surface component.
 - 20. The waveguide connector of any one of Claims 15 to 19, wherein the waveguide channel is for accommodating at least a portion of a waveguide.
 - 21. A method of manufacturing a waveguide assembly, comprising: coupling a waveguide connector to a waveguide; and

embedding the waveguide connector and the waveguide in a substrate material, wherein the waveguide connector has a neck portion disposed transverse to the waveguide and a waveguide channel passing though the neck portion for forming a channel between the waveguide and the surface of the

substrate material, thereby providing an interface from an embedded waveguide to a surface module.

- 22. The method of Claim 21, comprising capping the waveguide connector prior to embedding the waveguide connector in the substrate material.
- The method of Claim 21 or Claim 22, wherein the step of embedding the waveguide connector and the waveguide in a substrate material comprises providing a plurality of composite material layers to form the substrate material, each composite material layer surrounding the neck portion of the waveguide connector.
- 10 24. The method of Claim 23, wherein each composite material layer comprises respectively aligned material fibres.
 - 25. The method of Claim 24, further comprising selecting the material fibres from one or more of the following materials: carbon, glass, metal and Kevlar.
- 26. A waveguide assembly substantially as hereinbefore described with reference to the accompanying drawings.
 - 27. A panel substantially as hereinbefore described with reference to the accompanying drawings.
 - 28. An aircraft substantially as hereinbefore described with reference to the accompanying drawings.
- 29. A method of manufacturing an aircraft substantially as hereinbefore described with reference to the accompanying drawings.
 - 30. A surface module substantially as hereinbefore described with reference to the accompanying drawings.
- 31. A waveguide connector substantially as hereinbefore described with reference to the accompanying drawings.